

A 3D cutaway diagram of a calorimeter simulation. The diagram shows a complex, multi-layered structure with various colored components (red, green, blue, yellow, orange) representing different materials or simulation regions. A central horizontal axis is visible, with a green cylindrical component in the middle. The background is a light blue gradient.

Calorimeter Simulation Task List

GSU Hcal Workfest 2015

Detector setup

Priority Color Code:

- This workfest
- Longer term goals

- ▶ Detector tuning studies
 - Finish timing cut studies
 - Activate timing cut by default (60ns)
 - Light collection eff.
 - # of scintillator / scintillator density
- ▶ Code tuning
 - Evolve setup with parameter database
 - Physics list (metrics e.g. resolution, size, test beam comp.)
- ▶ Test beam studies

Detector performance and tools

Priority Color Code:

- ▶ EMCal
 - Calibration: Vera
- ▶ Hcal
 - Focus study on zero tilting angle
 - Neutral particle performance
 - Jets
 - Tilting angle VS jet performance in angular smearing

- This workfest
- Longer term goals

Jet studies

Priority Color Code:

- This workfest
- Longer term goals

► Code base

- Mike M. implemented major part of jet finder and jet evaluation toolset for user modules
- Port over jet background subtraction tools
- Revision flow-jet: Javier did lots of work before, keep code alive, few questions to further answer

► Jet performance

- Jet resolution (pp/AA), tails, splitting
- Unfolding
- Gamma-Jet
- Fragmentation studies

Additional simulation sample

- ▶ Pythia8 + (default) Geant4 jet sample
- ▶ Neutrons + 0-tilt angle Geant4
- ▶ Some HIJING background

Priority Color Code:

- This workfest
- Longer term goals

Extra Information



Tracking performance criteria

Tracking performance criteria

We have recently decided to adopt a set of criteria for tracking performance that can be applied to all combinations of our 4 tracking detector options - **in progress**

Physics Channel	Physics requirements	Momentum resolution	DCA resolution	eID h rejection	Single track off.	Fake track rate
$\Upsilon \rightarrow ee$	$\Delta M = 100 \text{ MeV}$ $A\epsilon = 50\%$ of geom. acceptance	$\Delta pT < 1.2\%$ (1-8 GeV/c)	N/A	> 90	90% ($> 2 \text{ GeV/c}$) ?	x% (before CEMC) y% (after CEMC)
$D'(z)/D(z)$	$\sigma^h/\sigma^{\text{jet}} = x\%$ $z = 0-0.8$	$\Delta pT < 4\%$ (1-40 GeV/c)	N/A	N/A ?	x% high pT y% low pT	x% within jet y% overall
b-jet ID via track counting	35% purity at 45% efficiency	?	$< 70 \mu\text{m}$	N/A	x% (set by 35% @ 45% goal)	y% (set by 35% @ 45% goal)
b-jet ID via secondary vertex	35% purity at 45% efficiency	?	$< 70 \mu\text{m}/(2-3?)$	N/A	90% ($> 2 \text{ GeV/c}$) ?	y% overall
$\gamma+h$ jet + h	h pT below jet reco threshold	?	N/A	N/A	90% ($> 2 \text{ GeV/c}$) ?	y% overall pT dependent
Particle flow jets	?	?	N/A	N/A	90% ($> 2 \text{ GeV/c}$) ?	y% overall pT dependent

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